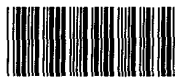


11-02-00

A

Patent Application
Docket No. 34650-657PT



23932

PATENT TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of: Magnus Tillgren, Magnus Hollström, and Patrik Olsson

For: METHOD AND SYSTEM FOR CONTROLLING AN ELECTRONIC UTILITY
DEVICE USING AND ELECTRONIC READING DEVICE

BOX PATENT APPLICATION
Assistant Commissioner
for Patents
Washington, D.C. 20231

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Sir:

PATENT APPLICATION TRANSMITTAL LETTER

Transmitted herewith for filing, please find the following:

- ☒ Specification, claims and abstract of the above-referenced patent application (total of 61 pages)
- ☒ 8 sheet(s) of drawing(s) (___formal/ ___informal).
- ☒ Combined Declaration and Power of Attorney (unexecuted).
- ___ An Assignment of the invention to: Telefonaktiebolaget LM Ericsson (publ)
- ___ A verified statement claiming small entity status under 37 CFR 1.9 and 1.27.
- ☒ Other (specify): Acknowledgment postcard.
- ___ This application is a:

- ___ Continuation
- ___ Divisional
- ___ Continuation-In-Part

JC918 U.S. PTO
09/703321
10/31/00

of prior copending parent application Serial No. _____ filed on _____
now pending.

Please amend the application to insert the following line in the beginning of
specification:

--This application is a Continuation of prior application Serial No. _____ filed on _____
_____, now pending.--



In the event that a petition to extend time under 37 CFR 1.136 is necessary in the parent application to maintain copendency for this application, a petition for an extension of the necessary time to maintain copendency is hereby requested for the parent application and the Commissioner is hereby authorized to debit our Account Number 10-0447 for the necessary fees.

The filing fee has been calculated as shown below:

	NO. FILED	NO. EXTRA	RATE	FEE
BASIC FEE				\$710
TOTAL CLAIMS	29-20	9	\$18	162
INDEPENDENT CLAIMS	3-3	0	\$80	0
MULTIPLE DEPENDENT CLAIM(S) PRESENTED			\$260	
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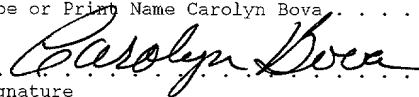
___ The Commissioner is hereby authorized to charge payment of the following fees during the pendency of this application or credit any overpayment to Deposit Account No. 10-0447.

___ Any patent application processing fees under 37 CFR 1.17 and under 37 CFR 1.20(d).

___ The issue fee set in 37 CFR 1.18 at or before mailing of the Notice of Allowance, pursuant to 37 CFR 1.311(b).


Spencer C. Patterson
Registration No. 43,849

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431</
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METHOD AND SYSTEM FOR CONTROLLING AN ELECTRONIC
UTILITY DEVICE USING AN ELECTRONIC READING DEVICE

REFERENCE TO EARLIER FILED PROVISIONAL APPLICATIONS

This patent application claims the benefit of
priority from, and incorporates by reference the entire
5 disclosure of, co-pending U.S. Provisional Patent
Application Serial Nos. 60/182,742, filed on February 16,
2000, 60/190,343, filed on March 16, 2000, and 60/192,662,
filed on March 28, 2000.

CROSS REFERENCE TO RELATED APPLICATION

10 The present application for patent is related to and
hereby incorporates by reference the subject matter
disclosed in U.S. Patent Application Serial Nos.

_____ (Attorney Docket No.34650-566PT),
entitled "Specially Formatted Paper Based Applications of
a Mobile Phone"; _____ (Attorney Docket
No.34650-569PT), entitled "Method and System for Using an
5 Electronic Reading Device as a General Application Input
and Navigation Interface"; _____ (Attorney
Docket No.34650-578PT), entitled "Predefined Electronic
Pen Applications in Specially Formatted Paper";

_____ (Attorney Docket No. 34650-579PT),
10 entitled "A System and Method for Operating an Electronic
Reading Device User Interface"; _____
(Attorney Docket No. 34650-601PT), entitled "Method and
System for Using an Electronic Reading Device on Non-paper
Devices"; _____ (Attorney Docket No. 34650-

15 602PT), entitled "Multi-layer Reading Device";
_____ (Attorney Docket No. 34650-604PT),
entitled, "Method and System for Configuring and Unlocking
an Electronic Reading Device"; _____ (Attorney
Docket No. 34650-606PT), entitled "Printer Pen";

20 _____ (Attorney Docket No. 34650-607PT),
entitled "Method and System for Electronically Recording
Transactions and Performing Security Function";

_____ (Attorney Docket No. 34650-608PT),
entitled "Electronic Pen with Ink On/ink off Function and
Paper Touch Sensing"; _____ (Attorney Docket
No. 34650-654PT), entitled "Method and System for Handling
5 FIFO and Position Data in Connection with an Electronic
Reading Device"; _____ (Attorney Docket No.
34650-655PT), entitled "Hyperlink Applications for an
Electronic Reading Device"; _____ (Attorney
Docket No. 34650-656PT), entitled "Measuring Applications
10 for an Electronic Reading Device"; and _____
(Attorney Docket No. 34650-658PT), entitled "Positioning
Applications for an Electronic Reading Device"; and
_____ (Attorney Docket No. 34650-673PT),
entitled "Method for Sharing Information Between
15 Electronic Reading Devices"; and in U.S. Provisional
Patent Application Serial Nos. _____
(Attorney Docket No. 34650-671PL), entitled "Electronic Pen
for E-Commerce Implementations"; and _____
(Attorney Docket No. 34650-672PL), entitled "Electronic Pen
20 Help Feedback and Information Retrieval"; all filed
concurrently herewith.

BACKGROUND OF THE INVENTION

Technical Field of the Invention

The present invention relates in general to the communications field, and in particular to an interaction
5 of an electronic reading device with an address pattern.

Description of Related Art

Numerous devices exist for accepting user input and controlling user interaction with desktop and portable computers, personal digital assistance (PDAs), mobile
10 phones, and other types of electronic devices. For example, a keyboard can be used to accept typed input and other types of commands, a mouse or a track-ball can be used to provide relative motion input as well as various types of point-and-click selections, a keypad can be used
15 to provide input of numerical data and functional commands, navigational keys can be used for scrolling lists or otherwise repositioning a cursor, and various types of touchpads or touchscreens can be used to provide absolute positional coordinate inputs. Each type of
20 mechanism for accepting input and for supporting user interaction has benefits and disadvantages in terms of

size, convenience, flexibility, responsiveness, and easy
of use. Generally, the selection of a particular type of
input mechanism is dependent upon the function of the
application and the degree and type of interaction
5 required.

With the ever expanding capabilities and availability
of applications both on the Internet and the area of
wireless technology, there continues to be a need to
develop and provide new mechanisms for accepting input and
10 interacting with users. In particular, some of the
existing technologies suffer from drawbacks or
limitations, such as size and flexibility, that make them
impractical and/or inconvenient to use in some situations.
By expanding the range of mechanisms for supporting user
15 interaction, application developers and end-users can have
greater flexibility in the selection of input devices.
Preferably, any such new mechanisms will provide increased
flexibility and will maximize user convenience. In
addition, the development of new mechanisms for
20 interacting with users can expand the realm of potential
applications.

For example, while a keyboard typically provides a great deal of flexibility, particularly when it is used in connection with a mouse, a touchscreen, or other navigational device, its size makes it inconvenient in many cases, especially in the wireless context.

SUMMARY OF THE INVENTION

The present invention comprises a method and system for controlling electronic utility devices. The method and system utilize an electronic reading device that includes a sensor for detecting portions of an address pattern on a specially formatted surface. In particular, the surface is formatted for use in controlling a specific electronic utility device and includes an address pattern from which a position on the address pattern can be determined by detecting a small portion of the address pattern. Thus, using the portion of the address pattern detected by the electronic reading device, a position or positions of the electronic reading device relative to the address pattern can be determined. The position or positions can then be converted into a control message, which is sent to a server associated with the specific

electronic utility device for use in controlling,
accessing, or operating the utility device.

Preferably, instructions for translating detected
positions into control messages are downloaded to a
5 processor or wireless application protocol (WAP) browser.
In performing the translation, the processor or WAP
browser identifies a uniform resource locator (URL)
associated with the detected portion of the address
pattern and generates common gateway interface (CGI) calls
10 that correspond to information entered, selected, or
written with the electronic reading device. Once the
processor or WAP browser performs this translation, the
control message, which contains the CGI calls, is sent via
a Bluetooth™ radio interface to a WAP server at the
15 identified URL. The WAP server then directs the specific
electronic utility device to perform the requested
functions specified in the control message.

In one embodiment of the invention, the processor or
WAP browser is contained within the electronic reading
20 device. In an alternative embodiment, the processor or
WAP browser is contained in a separate electronic device,
such as a mobile station. In either case, communications

between the electronic reading device, the separate electronic device, and the WAP server are preferably conducted via a Bluetooth™ radio interface.

BRIEF DESCRIPTION OF THE DRAWINGS

5 For a more complete understanding of the present invention, reference is made to the following detailed description taken in conjunction with the accompanying drawings wherein:

FIGURE 1 is a block diagram of a system in which an
10 electronic pen can be used as an input device;

FIGURE 2 is a schematic diagram of a system for supporting use of the electronic pen described in connection with FIGURE 1;

FIGURE 3 is an illustration of the protocol stacks
15 that can be used in the case of local communications between an electronic pen and an electronic pen client;

FIGURE 4 is an illustration of protocol stacks that can be used when an electronic pen and an electronic pen client communicate with one another via an Internet
20 connection;

FIGURE 5 is an illustration of a protocol stack for communications between an electronic pen client and each of the supporting entities when the electronic pen client is not located within a server on the Internet;

5 FIGURE 6 is an illustration of protocol stacks that are used for communications between an electronic pen client and each of the supporting entities when the electronic pen client is located on the Internet;

10 FIGURE 7 is a block diagram of the electronic pen logic that handles positions, strokes, actions, and grid descriptions;

FIGURE 8 is a block diagram of a state machine for the electronic pen control block shown in FIGURE 7;

15 FIGURE 9 is a block diagram of a state machine for an electronic pen client;

FIGURES 10A-10C are a message flow and signaling diagram illustrating the operation of the electronic pen system shown and discussed in connection with FIGURE 2; and

20 FIGURE 11 is a schematic diagram of a control system in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to a system in which an electronic reading device, such as an electronic pen, an electronic mouse, or a hand scanner, works in cooperation with an address pattern (e.g., a specially formatted paper) to provide for a detection of a location of the electronic reading device over the address pattern. For instance, a pattern of dots can be defined such that, by examining a very small portion of the pattern, a precise location in the overall pattern can be determined. In fact, it is possible to define a pattern that has the size of 73,000,000,000,000 A4 pages, which is equivalent to half the size of the entire United States. Portions of the pattern can be placed on sheets of paper or other objects.

Then, using an electronic scanner pen that can detect the dots in the pattern, it is possible to detect the location of the pen with respect to the unique pattern. For example, when such a pen is used in connection with a specially formatted paper, the pen can detect its position (e.g., using a built in camera) by detecting a 3 mm by 3 mm portion of the pattern. By taking approximately 100 pictures per second, the pen is capable of determining its

exact position to within 0.1 mm or less. This system can be used to provide user input, to facilitate user interaction, or to store handwritten notes or drawings. Moreover, by associating portions of the overall pattern with certain applications, such a system can be used to interact with wide variety of applications.

Referring now to FIGURE 1, there is illustrated an example of a system 2 in which an electronic pen 10 can be used as an input device. The electronic pen 10 includes an ink cartridge and is capable of writing in a typical fashion. The electronic pen 10, however, includes some type of sensor (e.g., a built-in camera) that is used for detecting an address pattern on a specially formatted piece of paper 12. In particular, the paper 12 is formatted with a small portion of a large address pattern such that when the electronic pen 10 is used to write on or otherwise make marks on the paper 12, the writings or markings can be electronically detected and stored.

As an example, the paper 12 might constitute a form that can be used for sending an email. Thus, the paper 12 might include a space for writing in the email address of an intended recipient, a space for writing a subject of

the email, and a space for writing the body of the email.
As the electronic pen 10 is used to fill in each of the
spaces, the position and movement of the electronic pen 10
on the paper 12 can be determined by repeatedly detecting
5 the current x, y coordinates of the pen 10 (e.g., at rate
of 100 frames per second). The markings can then be
converted into ASCII text using an appropriate handwriting
recognition program. Once the user completes the form,
the email can be sent, for example, by checking a send box
10 at a predetermined location on the paper 12.

Preferably, the coordinate information collected by
the pen 10 is sent by a short range radio transmitter in
the electronic pen 10 to a nearby mobile station 14 using
a short range radio interface 16 such as a local wireless
15 radio link (e.g., a local wireless radio link supported by
Ericsson's Bluetooth™ wireless communications technology).
Alternatively, instead of using a mobile station 14, the
coordinate information could also be sent to, for
instance, a desktop or portable computer, a personal
20 digital assistant (PDA), a television, or a Bluetooth
terminal. Moreover, instead of using a local wireless
radio link, other types of local wireless links, such as

inductive coupling and infrared light; other types of
radio links, such as Global System for Mobile
Communication (GSM); or wired transmission media, such as
a cable can also be used. The information can then be
5 forwarded via an appropriate link, such as a cellular air
interface 18, to a base station 20 or other network node.

Referring now to FIGURE 2, there is illustrated a
schematic diagram of a system 2 for supporting use of the
electronic pen 10 described in connection with FIGURE 1.
10 Throughout the subsequent discussion, the system 2 is
described primarily in connection with an electronic pen
10. It will be understood, however, that the invention
and the underlying system 2 can instead use any type of
electronic reading device, such as an electronic pen, an
15 electronic mouse, or a hand scanner. As shown in FIGURE
2, the system 2 includes six different entities, including
the electronic pen 10, electronic pen client 22, a control
node 24, a name server 26, a base translator 28, and an
application server 30. Although these various devices are
20 described and depicted separately, it is also possible to
combine two or more of the entities into the same device

(e.g., the electronic pen 10 and electronic pen client 22 can be contained in the same device).

The electronic pen 10 is responsible for detecting positions on the address pattern, producing actions, and sending information to the electronic pen client 22. In addition to being able to leave pen markings, some electronic pens can also have the ability to produce other types of output, such as sound, vibration, or flashing lights. The electronic pen 10 includes a memory for storing a current grid, which comprises information relating to an area of the address pattern that is near the most recently detected position of the electronic pen 10. When the electronic pen 10 is loaded with the current grid, it knows what actions to take based on the positions that are read from the address pattern. When the electronic pen 10 is first turned on or when it moves to an area outside of the current grid, the electronic pen 10 must first request a new grid description before it can continue processing information. In such a situation, the electronic pen 10 requests a new grid description from the electronic pen client 22.

The electronic pen client 22 can be located in a mobile station 14, in a PDA, in a desktop or portable computer, in the electronic pen 10 itself, in a server somewhere on the Internet, or in another device. The electronic pen client 22 serves as the center of communications in the overall system 2. In particular, the electronic pen client 22 receives new grid requests and action requests from the electronic pen 10 and responds to these requests by contacting an appropriate entity within the overall system 2 to properly respond to the request from the electronic pen 10. Furthermore, when the electronic pen 10 is being used in connection with a particular application, the electronic pen client 22 can store the application and/or any corresponding data received from the electronic pen 10 to facilitate processing and use of the application.

The name server 26 is used for translating a detected position on the address pattern into a Uniform Resource Location (URL) associated with that position. Different portions of the address pattern are assigned to different applications. Neither the electronic pen 10 nor the electronic pen client 22, however, is aware of all of the

different applications and the particular areas assigned to each application. Thus, when the electronic pen 10 detects a new or unknown position, it forwards the position information to the electronic pen client 22, which in turn sends the information to the name server 26. The name server 26 then identifies an application associated with the received position and retrieves a URL where a description of the particular application can be found. The retrieved URL can then be used by the electronic pen client 22 to retrieve the application description.

As an alternative, the name server 26 can comprise a global name server that keeps track of a location, in the form of URLs to local name servers, where more information can be found about different addresses in the pattern. Similarly, each local name server can use other local name servers to obtain the necessary information, i.e., to convert a position into a URL where an application description can be found. At the lowest level, the local electronic pen client should know all the paper addresses that are within a specific application or applications.

There are some services that should be available in the overall system 2 for which it is inconvenient or not feasible to support such services in the electronic pen 10 or the electronic pen client 22. In such a case, the base translator 28 can be used to support the services. For example, the base translator 28 might contain handwriting recognition software for converting pen actions into text or for converting pen actions into a predefined set of symbols. When such services are needed, the electronic pen client 22 can send a request to the base translator 28 along with the necessary data, and the base translator 28 can perform the requested service.

Another entity in the system 2 is a control node 24. The control node 24 is used for responding to actions in a standardized way. For example, the control node 24 can be used to respond to certain generic functions, such as "cancel" or "submit" functions, in a consistent manner without regard to the particular application that is currently active.

In addition, the control node 24 is used for creating streaming-like applications. For instance, some applications might require that the positions on the

address pattern that are detected by the electronic pen 10
be immediately sent, upon detection, to the electronic pen
client 22 for use by the application (i.e., the electronic
pen 10 does not wait to transmit the position data until a
5 complete stroke is detected or until a "send" field is
touched). One example is an application that is used to
control an industrial robot in a warehouse. In such a
case, the application description that is loaded onto the
electronic pen server 22 can include instructions that all
10 positions be streamed to a control node 24. As a result,
the control node 24 can receive the positions in real time
and can control the robot without waiting for the form
(i.e., the current grid) to be completed. Thus, the
control node 24 can perform a real-time translation from
15 detected positions to a responsive action, such as moving
an object (e.g., a robot, a valve, etc.) or controlling a
process.

The application server 30 is a regular web or
wireless application protocol (WAP) server that supports
20 an application associated with a particular area of the
address pattern. The application server 30 stores an
application description and provides the application

description to the electronic pen client 22 upon request.

In addition, the application server 30 receives input data from the electronic pen 10 via the electronic pen client

22. For example, the application description might define

5 a number of data entry areas on a form. Thus when data is

entered on the form by the electronic pen 10, the data is

received by the electronic pen client 22, converted into

text using handwriting recognition software, and forwarded

to the application server 30, which stores the data or

10 otherwise processes the data in accordance with the

function of the application.

Referring now to FIGURES 3 through 6 there are illustrated various examples of protocol stacks that can

be used for communicating between the entities shown in

15 FIGURE 2. Generally, however, such protocols apply

however, only if the two communicating entities are

implemented in different devices. If two or more entities

are combined into one device, a proprietary protocol can

be used to communicate between the entities. FIGURE 3

20 illustrates the protocol stacks that can be used in the

case of local communications (e.g., using Bluetooth)

between the electronic pen 10 and the electronic pen

client 22. If, on the other hand, the electronic pen 10
and the electronic pen client 22 communicate with one
another via an Internet connection, the protocol stacks
depicted in FIGURE 4 will be used. FIGURE 5 illustrates a
5 protocol stack for communicating between the electronic
pen client and each of the supporting entities, such as
the name server 26, the control node 24, the base
translator 28, and the application server 30, when the
electronic pen client 22 is not contained within a server
10 on the Internet (e.g., such as when the electronic pen
client 22 is located in a mobile phone 14). Finally,
FIGURE 6 depicts the protocol stacks that are used when
the electronic pen client 22 is located on the Internet.

There are a number of procedures that can be used by
15 the various entities in the system 2 to allow the system
to operate properly. When the electronic pen 10 detects a
position on the address pattern that is not within its
currently loaded grid or when the electronic pen 10 has no
currently loaded grid, the electronic pen 10 initiates a
20 new grid procedure. The new grid procedure involves
sending a new grid request object to the electronic pen
client 22. The new grid request object contains the newly

detected position, a description of the actions that the electronic pen 10 can natively support, and a description of the output signals that the electronic pen 10 supports.

The reply to a new grid request object is a grid

5 description, which can be provided by the electronic pen client 22 from its own internal memory or from the information provided by an application server 30.

Generally, the electronic pen client 22 extracts the grid description from an application description received from
10 the application server 30. The grid description should only contain action-field-types that the electronic pen 10 has indicated that it natively supports, which means that the electronic pen client 22 in some cases should convert the extracted grid description into a format that the
15 electronic pen 10 can understand.

In some situations, it may be necessary for the electronic pen 10 to unload its current grid at the request of the electronic pen client 22. In such a case, the electronic pen client 22 sends an empty grid
20 description to the electronic pen 10, thereby causing the electronic pen 10 to unload its current grid. This can occur, for example, when a particular application is

complete or when a new grid description request received from the electronic pen 10 cannot be fulfilled, such as when the position received from the electronic pen 10 is not registered in the name server 26.

5 Another similar message is the empty grid description with a grid exception. When the electronic pen 10 requests a new grid description from the electronic pen client 22, the electronic pen client 22 uses the detected position specified in the request to ask the name server 10 26 for a URL where the application description can be found. If no URL is returned, the electronic pen client 22 can send an empty grid description with a grid exception to the electronic pen 10. The grid exception comprises a rectangle or other shape indicating the area 15 around the detected position where no registered applications can be found. Preferably, the indicated area is as large as possible so that the electronic pen 10 and/or electronic pen client 22 know the extent of the surrounding area that is unassigned and do not have to 20 repeatedly send requests to the name server 26. Thus, the empty grid description with a grid exception causes the electronic pen 10 to unload its current grid and also

informs the electronic pen 10 of an area surrounding the detected position that can essentially be ignored because its is not associated with any application.

5 The procedure that is used when the electronic pen 10 detects a new position is a find application description location procedure. This procedure is used by the electronic pen client 22 to translate a detected position received from the electronic pen 10 into a URL where a description of an application corresponding to that position can be found. 10 The procedure involves sending a request from the electronic pen client 22 to the name server 26 containing identification of the detected position. The name server 26 responds by sending a reply to the electronic pen client 22 containing a URL where an application description can be found or, if the detected position is not registered in the name server 26, 15 containing an indication that no associated application is known to exist.

20 Once the electronic pen client 22 knows the URL where an application description can be found, the electronic pen client 22 can initiate a get application description procedure, which allows the electronic pen client 22 to

retrieve the application description from the application
server 30. In particular, the electronic pen client 22
sends an application description request containing a
unique ID for the requesting electronic pen 10 and/or
5 electronic pen client 22 to the application server 30
located at the URL address provided by the name server 26.
In response, the application server 30 provides an
application description object to the electronic pen
client 22, which loads the application onto the electronic
10 pen client 22. The application description object is
similar to an HTML form with some additions and
modifications.

Furthermore, the application description object can
be sent from the application server 30 to the electronic
15 pen client 22 in response to a submitted form (i.e., a
submission of one completed form might automatically
result in a new form being loaded onto the electronic pen
client 22). A related procedure is the application submit
procedure, which is used by the electronic pen client 22
20 when the user of the electronic pen 10 selects a "submit"
field in a form. In response to the selection of the
"submit" field, the electronic pen client 22 will submit

the form content in accordance with instructions received in the application description. Typically, the electronic pen client 22 will submit the form content, in the same way as a regular web browser, to a URL specified in a form tag of the application description.

When an action that can be handled by the electronic pen 10 itself is generated, an action procedure is initiated by the electronic pen 10 to send an action request object to the electronic pen client 22. If the electronic pen client 22 cannot translate the action into a field value itself, the electronic pen client 22 further forwards the request to a base translator 28 for translating the action into a field value. In response to the action request object, an action reply object is sent from the electronic pen client 22 to the electronic pen 10. The action reply object contains output information that indicates to the electronic pen 10 which outputs signals to use. The output information, however, cannot be of type that the electronic pen 10 has previously indicated that it does not support. In some instances, the action reply object might contain a new grid description. In such a case the electronic pen 10 will unload its

current grid description and load the new grid description. Similarly, if the action reply object contains an empty grid description, the electronic pen 10 will simply unload its current grid description.

5 The action request object is also sometimes used to specify actions that should be processed by the control node 24. In this instance, the electronic pen client 22 initiates a control procedure by forwarding the received action to the appropriate control node 24. As a result,
10 the control node 24 sends an action reply object to the electronic pen client 22.

15 The operation of the electronic pen 10 will now be discussed in greater detail. Each electronic pen 10 has a unique pen ID, which is sent to the application server 30 when an application description is requested. The
20 electronic pen ID allows the application to identify the particular user that is using the application and to distinguish between multiple concurrent users of the same application, such as when different electronic pens 10 are being used in connection with separate sheets of paper that each contain the same portion of the address pattern.

Referring now to FIGURE 7, there is illustrated a block diagram of the electronic pen logic that handles positions, strokes, actions, and grid descriptions for the electronic pen 10. The electronic pen 10 includes a control block 32 for controlling the operation of the electronic pen 10. A grid description block 34 represents a memory location that stores a current grid description. At any given time, the electronic pen 10 can be in either of two modes. In a first mode, a grid description is loaded, while in a second mode, the grid description block 34 is not loaded with a current grid description.

As the electronic pen 10 moves across an address pattern, the electronic pen 10 periodically (e.g., every 1/100 of a second) detects a position by detecting all of the dots within, for example, a 3mm by 3mm area. Each detected position is forwarded (as indicated at 36) to a position first in first out (FIFO) block 38, which acts as a buffer for temporarily storing the detected positions. The clocking of the position FIFO block 38 is controlled by the control block 32 (as indicated at 40).

The detected position is fed from the position FIFO block 38 (as indicated at 42) to an in grid detector 44.

The in grid detector 44 retrieves data from the grid description block 34 (as indicated at 46) and determines whether the received position is within the loaded grid description. If not, the in grid detector 44 notifies the control block 32, which in turn initiates a request for a new grid. When the detected position is within the current grid, the position is then sent (as indicated at 50) from the in grid detector 44 to a stroke engine 52. The stroke engine 52 converts the received positions into strokes, which are then sent (as indicated at 54) to an action engine 56. A complete stroke is created when the electronic pen 10 is lifted from the paper or when it moves outside of the grid field where the stroke began. Finally, the action engine 56 converts the received stroke into an action that can be sent to the electronic pen client 22. By using grid action-field-types, the action engine knows which type of action to produce for a specific grid field.

Referring now to FIGURE 8, there is illustrated a block diagram of a state machine for the control block 32 shown in FIGURE 7. In this figure, events are indicated in capital letters, while tasks associated with the event

are depicted in brackets. The process starts at step 60 with a start up event 62, which causes the position FIFO block 38 to begin receiving detected positions.

Initially, the electronic pen 10 is in a no grid loaded state 64, which means that the electronic pen 10 does not have a grid loaded in the grid description block 34. As a result, the control block 32 generates an outside grid indication 66, thereby causing the electronic pen 10 to send the request for a new grid description to the electronic pen client 22 (i.e., in accordance with the new grid procedure) and to stop the FIFO buffer 38. At this point, the electronic pen 10 enters a waiting for grid state 68.

Once the new grid has been received (as indicated at 70), the control block 32 moves to a grid loaded state 72, at which time the new grid is loaded into the grid description block 34 and the position FIFO block 38 resumes operation. On the other hand, if no grid is received (as indicated at 74), at least a portion of the positions stored in the FIFO buffer 38 are erased. Which part of the FIFO buffer to erase is determined by the grid exception area, if any, in the received empty grid

description. Accordingly, all positions stored in the
FIFO buffer 38 that are within the grid exception area
should be erased. If no grid exception is received, the
stroke associated with the position is erased. In
5 addition, the FIFO block 38 resumes operation and the
control block 32 moves into the no grid loaded state 64.

When the control block 32 is in the grid loaded state
72, a current grid is loaded in the grid description block
34. While the control block 32 remains in this state 72,
10 the position FIFO block 38 continues to receive detected
positions and passes them on to the stroke engine 52 and
action engine 56. Actions produced by the action engine
56 are sent (as indicated at 58) to the electronic pen
client 22 (i.e., in accordance with the action procedure
15 described above).

At some point, an outside grid indication 74 may be
received by the control block 32 from the in grid detector
44. The outside grid event 74 causes the FIFO block 38 to
stop generating new positions. In addition, the
20 electronic pen 10 enters a flushing stroke and action
state 76 wherein the strokes that are currently in the
stroke engine 52 and the actions that are currently in the

action engine 56 are flushed to the electronic pen client 22. Once the stroke engine 52 and action engine 56 have been fully flushed (as indicated at 78), the electronic pen 10 sends a request for a new grid to the electronic pen client 22 and unloads the current grid. The control block 32 then moves back into the waiting for grid state 68.

As a general matter, the electronic pen 10 may be capable of supporting various different types of output, including audio, such as warning tones; visual, such as a flashing light; tactile, such as vibration; and/or ink. In some cases, it might be desirable to allow the user of the electronic pen 10 to turn off the ink of the pen 10, such as when the electronic pen is being used on a portion of the address pattern that is public or shared or when the user wants to be able to reuse the current sheet of paper.

The electronic pen client 22 will now be described in greater detail. Generally, the electronic pen client 22 is analogous to a regular web browser. It is responsible for loading applications from application servers 30 and for handling input from the electronic pen 10. Preferably, the electronic pen client 22 is located in a

separate device from the electronic pen 10 itself. This is because it is desirable to minimize the size and power supply requirements of the electronic pen 10, which will likely be adversely affected by the processing resources and memory necessary to support the functions of the electronic pen client 22.

Referring now to FIGURE 9, there is illustrated a block diagram of a state machine for the electronic pen client 22. Initially, the electronic pen client 22 is in a no application loaded state 80. The electronic pen client 22 recognizes only one signal when in this state 80, namely a new grid request from the electronic pen 10. Such a request causes a load grid indication event 82. The electronic pen client 22 responds by sending a request to the name server 26 to translate a position contained within the new grid request into a URL where the application description can be found (i.e., in accordance with the find application location procedure). Next, the electronic pen client 22 enters a waiting for application description URL state 84. If no URL for the application description can be found (as indicated at 86), the electronic pen client 22 sends a new grid reply to the

electronic pen 10, wherein the reply contains an empty grid description with a grid exception. As a result, the electronic pen client 22 returns to the no application loaded state 80.

5 If a URL for the application description is received from the name server 26 (as indicated at 88), the electronic pen client 22 sends a request to the application server 30 to retrieve the application description (i.e., in accordance with the get application
10 description procedure). Accordingly, the electronic pen client 22 enters a waiting for application description state 90.

15 If the electronic pen client 22 does not receive an application description from the application server 30 (as indicated at 92), a new grid reply is sent by the electronic pen client 22 to the electronic pen 10 wherein the reply contains an empty grid. Thus, the electronic pen client 22 returns to the no application loaded state 80. If, however, the electronic pen client 22 does
20 receive an application description from the application server 30 (as indicated at 94), the electronic pen client 22 sends a new grid reply to the electronic pen 10

containing a new grid description, and the electronic pen client 22 loads the application in its memory. In addition, the electronic pen client 22 moves into an application loaded state 96.

5 In the application loaded state 96, five types of actions can be received by the electronic pen client 22 from the electronic pen 10. First, a received action can include a request that the electronic pen client 22 cannot handle itself, in which case the electronic pen client 22 will send the action to the base translator 28 (as indicated at 98). The electronic pen client 22 then moves into a waiting for response from the base translator state 100. Once a base translator response 102 is received by the electronic pen client 22, the electronic pen client 22 updates a current form or other data associated with the currently loaded application and sends an action reply to the electronic pen 10 with appropriate output information.

Another type of action that the electronic pen client 22 can receive from the electronic pen 10 is a request that should be forwarded to a control node 24. In such a case, the action is sent to a control URL specified in the application description (as indicated at 104), and the

electronic pen client 22 enters a waiting for response
from the control state 106. Once a response is received
from the control (as indicated at 108), the electronic pen
client 22 sends an action reply to the electronic pen 10
5 with appropriate output information.

A third type of action is a submit form request, in
response to which the electronic pen client 22 will submit
the current form to the application server 30 that is
identified by the URL in the application description (as
10 indicated at 110). The electronic pen client 22 then
enters a waiting for response from the application server
state 112. If the application server 30 responds by
sending an empty application description to the electronic
pen client 22 (as indicated at 114), the current
15 application is unloaded from the electronic pen client 22
and an action reply is sent to the electronic pen 10 with
an empty grid. As a result, the electronic pen client 22
returns to the no application loaded state 80. On the
other hand, if the application server 30 responds with a
20 non-empty application description, the old application is
unloaded from the electronic pen client 22, the new
application description is parsed and loaded in the

electronic pen client 22, an action reply is sent to the electronic pen 10 with a new grid description and with appropriate output information, and finally the electronic pen client 22 returns to the application loaded state 96.

5 A fourth type of action that can be received by the electronic pen client 22 from the electronic pen 10 is a request to load a new grid. This action occurs, for example, when a position outside of the current grid is detected by the electronic pen 10. When a new grid
10 request is received, the electronic pen client 22 sends a request to the name server 26 (as indicated at 116) and the electronic pen client 22 returns to the waiting for application description URL state 84.

15 Finally, a fifth type of action that can be received by the electronic pen client 22 is an action that the electronic pen client 22 can handle itself, in which case the electronic pen client 22 updates the current form and sends an action reply to the electronic pen 10 with appropriate output information (as indicated at 118). The
20 electronic pen client 22 then remains in the application loaded state 96. One type of action that the electronic pen client 22 might be able to handle itself is a local

application. For example, the electronic pen client 22 might be capable of performing certain basic functions that are defined by a local application. Thus, when the electronic pen client 22 receives a new grid request, the position associated with the new grid request can be analyzed to determine if it corresponds to a local application. If so, the electronic pen client 22 can load the application description from its local memory, send a new grid description to the electronic pen 10 without having to communicate with the name server 26 or the application server 30.

Another action that might be handled locally by the electronic pen client 22 relates to the selection of fields within a form. When the electronic pen client 22 receives an action, the field that corresponds to that action receives focus. When this occurs, the electronic pen client 22 might display the field's value on its display or output the value by audio. In addition, the electronic pen client 22 might allow the user to edit the value of the field by means other than the electronic pen 10. Yet another type of action that might be handled by the electronic pen client 22 itself are actions that

relate to a clipboard function. When a "copy" field is selected, the value of the field that had focus at the time the copy field was selected is transferred to the clipboard. Similarly, when a "paste" field is selected,
5 the value stored in the clipboard is transferred to the field that had focus at the time the paste field was selected.

Referring now to FIGURES 10A through 10C, there is shown, by way of example, a message flow and signaling
10 diagram illustrating the operation of the electronic pen system 2 depicted in and discussed in connection with FIGURE 2. Initially, the electronic pen 10 detects a first position on the address pattern at step 120 (e.g., at a location on a sheet of paper designated for composing
15 and sending emails). At this stage, it is assumed that the electronic pen 10 is in a no grid loaded state. Thus, in response to the detection of the first position, the electronic pen 10 sends a new grid request 122, which contains the detected position information, to the
20 electronic pen client 22. As a result, the electronic pen client 22 sends an application location request 124 containing the detected position information to the name

server 26, at step 126. The name server 26 translates the detected position into a URL where an application description that corresponds to the detected position can be found (e.g., a URL address for a server containing an email application), and returns an application location
5 reply 128 containing the retrieved URL to the electronic pen client 22.

The electronic pen client 22 then sends an application description request 130, which contains the
10 unique pen ID for the electronic pen 10, to the application server 30. The application server 30 retrieves the application description at step 132 and sends an application description reply 134 containing the retrieved application description to the electronic pen
15 client 22. The electronic pen client 22 then parses and stores the application description at step 136. This step further involves generating a current grid description from the application description and sending the grid description to the electronic pen 10 in a new grid reply
20 138. The electronic pen 10 stores the received grid description at step 140 and resumes processing of the detected positions. Using the detected positions and the

information in the grid description (e.g., so that the electronic pen 10 knows which fields of the email form are being filled in), the electronic pen 10 generates strokes at step 142 and generates actions at step 144 using the stroke engine 52 and action engine 56 shown in FIGURE 7.

Each time an action is generated that cannot be handled by the electronic pen 10 itself, an action request 146 containing a description of the action is sent from the electronic pen 10 to the electronic pen client 22. At this point, the electronic pen client 22 should determine what type of action has been received so that it can respond to the action in an appropriate manner. First, it is determined whether the action requires the attention of, or otherwise should be processed in accordance with, a local application at step 148. Very basic applications or frequently used applications (e.g., delete entered text), for example, might be stored locally to avoid having to contact another entity. In such a case, the electronic pen client 22 retrieves the local application at step 150 and sends an action reply 152, which can contain a new grid description or other appropriate information.

However, if it is determined at step 148 that the received action does not relate to a local application, the process continues at step 154 where it is determined whether the received action requires processing by an external translator (e.g., handwriting recognition). If so, an action request 156 containing a description of the action is sent by the electronic pen client 22 to the base translator 28. The base translator 28 processes the action at step 158 and sends an action reply 160 containing output information responsive to the received action (e.g., text corresponding to written characters) to the electronic pen client 22, which can forward the output information to the electronic pen 10 in an action reply 162, if necessary.

If it is determined at step 154 that the received action does not require processing by an external translator, it is next determined whether the action relates to a control application at step 164. If so, an action request 166 containing a description of the action is sent by the electronic pen client 22 to the control server 24. The control server 24 processes the received action at step 168 and, if a response is necessary,

returns output information responsive to the received action in an action reply 170, which is forwarded from the electronic pen client 22 to the electronic pen 10 in an action reply 172.

5 Assuming that it is determined at step 164 that the received action does not relate to a control function, it is next determined whether the action comprises a request to submit a form at step 174 (e.g., a selection of a "send" area on the email form). If so, an action request
10 176 containing the data entered onto the form is sent by the electronic pen client 22 to the application server 30. The application server 30 processes the form at step 178 and sends an action reply 180 containing a new application description (or an empty application description) to the
15 electronic pen client 22. The electronic pen client 22 parses and stores the new application description at step 182 and generates a new grid description from the newly received application description. The electronic pen client 22 then sends an action reply 184 containing the
20 new grid description. Although not illustrated in the figure, the electronic pen 10 will typically respond to the receipt of a new grid description by unloading its

current grid description and loading the new grid
description into its memory.

At some point, it is assumed that the electronic pen
10 detects a position that is outside of the currently
5 loaded grid at step 186. In response to such an event,
the electronic pen 10 sends a new grid request 188
containing the newly detected position data to the
electronic pen client 22. In response, the electronic pen
client 22 again generates an application location request
10 190 containing the detected position data and sends the
request to the name server 26. The name server 26
determines whether a URL for an application description
that corresponds to the newly detected position is
available at step 192.

15 If so, the name server 26 sends an application
location reply 194 containing a retrieved URL to the
electronic pen client 22, which in turn sends an
application description request 196 containing the unique
pen ID for the electronic pen 10 to the application server
20 30 at the identified URL address, just as previously
discussed in connection with messages 128 and 130. In
this case, however, it is assumed that the application

server 30 determines that the requested application
description is unavailable at step 198. As a result, the
application server 30 sends an application description
reply to the electronic pen client 22 containing an empty
5 application description. In response to the receipt of an
empty application description, the electronic pen client
22 unloads the current application at step 202 and sends a
new grid reply 204 containing an empty grid description to
the electronic pen 10. The electronic pen 10 responds to
10 the receipt of the empty grid description by unloading the
current grid description at step 206.

Another possibility is that the name server 26
determines at step 192 that a URL corresponding to the
detected position is not available. In this situation,
15 the name server 26 sends an application location reply 208
to the electronic pen client 22. The reply 208 may simply
be empty to indicate that a URL is not available.
Preferably, however, the reply 208 contains a grid
exception defining the largest area possible around the
20 detected position for which there is no corresponding URL.
In response to the reply 208, the electronic pen client 22
sends a new grid reply 210 containing an empty grid

description with a grid exception. Upon receiving the
reply 210, the electronic pen 10 unloads the current grid
description at step 212. Furthermore, assuming that the
electronic pen 10 receives and recognizes the grid
5 exception information, the electronic pen 10 may
subsequently be able to determine that certain detected
positions on the address pattern are not associated with
any application without having to send a request to the
name server 26 or the application server 30.

10 In accordance with the present invention, an
electronic pen 10 can be used to control a separate
utility device using a wireless application protocol (WAP)
server associated with the separate utility device. Such
a system operates in much the same way as described in
15 Swedish Application No. 9904373-9, entitled "A Device and
a Method for Operating an Electronic Utility Device from a
Portable Telecommunication Apparatus," filed December 1,
1999, and U.K. Application No. 0018027.3, entitled
"Communications Systems," filed July 21, 2000, both of
20 which are incorporated herein by reference. In the
present invention, however, a user of the electronic pen
10 can access, control, and operate each of a plurality of

electronic accessories, home appliances, or other external electronic utility devices using a WAP browser contained either in the electronic pen 10 or in an electronic pen client 22. By using the electronic pen 10 on an addressed surface 12, a user can input commands or other data that can be communicated by the WAP browser to a WAP server module associated with the electronic accessory, home appliance, or other external electronic utility device to be accessed, controlled, or operated.

Referring now to FIGURE 11, there is illustrated a schematic diagram of a control system 220 in accordance with the present invention. By writing with the electronic pen 10 on, or touching the electronic pen 10 to, an appropriate area on an addressed surface 12 (e.g., a sheet of paper that contains a form for controlling a particular electronic utility device), a WAP browser 222 or electronic pen client 22 can be used to communicate with a WAP server module 224, 226, or 228 by sending a command or other data corresponding to the information entered or written with the electronic pen 10. The WAP server module 224, 226, or 228 then uses the command or other data to operate the associated electronic utility

device 230, 232, or 234 and/or to control the
functionality thereof.

In one embodiment of the invention, the WAP browser
222 or electronic pen client 22 is included in the
5 electronic pen 10 itself. The electronic pen 10, using
the WAP browser 222 or client processor, detects positions
of the electronic pen 10 relative to the addressed surface
12 and translates the detected positions into uniform
resource locators (URLs) with common gateway interface
10 (CGI) calls. The CGI calls are then transmitted by a
Bluetooth™ transceiver 236 in the electronic pen 10, via a
Bluetooth™ radio interface 238 to the WAP server module
224, 226, or 228 associated with the identified URL. In
this case, the portion of the address pattern associated
15 with the WAP server module 224, 226, or 228 must first be
loaded into the electronic pen 10 to enable the electronic
pen 10 to translate detected positions into appropriate
commands or other data. This information can be
downloaded into electronic pen 10 by a personal computer
20 (PC) 240 or mobile station 14 using a Bluetooth™ radio
interface 238. Alternatively, instead of using a
Bluetooth™ radio interface 238, other types of wireless

technology, such as infrared signalling or inductive coupling, or wired technology, such as a cable connection, can be used.

As an example, the electronic pen 10 can be used in connection with a sheet of paper containing a predefined portion of the address pattern to control a CD player 230. For instance, by drawing a play symbol, writing the word "play," or touching the electronic pen 10 within a "play" field on the sheet of paper, the WAP server module 224 associated with the CD player 230 can execute the play command and cause the CD player 230 to begin playing a CD. Furthermore, the electronic pen 10 can be used to perform more advanced functions, such as programming a VCR. In particular, the electronic pen 10 can be used to fill in a "program VCR" form. The electronic pen 10 then transmits the VCR timer settings via a Bluetooth™ interface 238 to the WAP server module 226 associated with the VCR 232. As a result, the WAP server module 226 automatically programs the VCR 232 to record in accordance with the designated timer settings.

In another embodiment of the invention, the WAP browser 222 or electronic pen client 22 is implemented

within a mobile phone 14 or other electronic device, such as a PC 240. In this case, grid information relating to the portion of the address pattern used to control a particular electronic utility device 230, 232, or 234 can
5 be downloaded via an air interface or other Internet connection using WAP. In this case, a user of the electronic pen 10 can obtain feedback relating to the commands or entered data using a display screen 242 on the mobile station 14 or other electronic device.

10 As an example of this embodiment, a portion of a newspaper that lists television program schedules can be formatted with a selected portion of the address pattern. By using the electronic pen 10 to draw a circle around a particular television program, a user indicates that the
15 selected program should be recorded by the VCR 232 or that a television 234 should be tuned to the identified television program. The positions on the newspaper address pattern detected by the electronic pen 10 are transmitted by a Bluetooth™ transceiver 236 via a
20 Bluetooth™ radio interface 238 to the mobile station 14. The mobile station 14 downloads information about the area of the address pattern on which the positions are

detected. Using this information, the WAP browser 222 or electronic pen client 22 in the mobile station 14 translates the detected positions into appropriate commands for controlling the VCR 232 or television set

5 234. The identified commands are transmitted by the WAP browser 222 to the appropriate WAP server module 226 or 228, directly or via the Bluetooth™ transceiver 236 of the electronic pen 10, over a Bluetooth™ radio interface 238. The receiving WAP server module 226 or 228 then performs
10 the requested operation.

Although various preferred embodiments of the method and apparatus of the present invention have been illustrated in the accompanying Drawings and described in the foregoing Detailed Description, it is understood that
15 the invention is not limited to the embodiments disclosed, but is capable of numerous rearrangements, modifications, and substitutions without departing from the spirit of the invention as set forth and defined by the following claims. Furthermore, it shall be understood that the
20 terms "comprises" and "comprising," when used in the foregoing Detailed Description and the following claims, specifies the presence of stated features, elements,

steps, or components but does not preclude the presence or addition of one or more other features, elements, steps, components, or groups thereof.

WHAT IS CLAIMED IS:

1 1. An electronic reading device, comprising:
2 a sensor for detecting a portion of an address
3 pattern on a formatted surface, wherein a position of the
4 electronic reading device relative to the address pattern
5 can be determined from the detected portion;
6 a processor for translating the detected portion
7 of the address pattern into an identified position and for
8 generating a wireless application protocol (WAP) message
9 based, at least in part, on the identified position; and
10 a transmitter for transmitting the WAP message
11 to a WAP server.

1 2. The electronic reading device of claim 1,
2 wherein the sensor detects a plurality of successive
3 portions of the address pattern and the processor
4 translates the plurality of successive portions into a
5 plurality of successive identified positions, the WAP
6 message based on the plurality of successive identified
7 positions.

1 3. The electronic reading device of claim 1,
2 wherein the processor comprises a WAP browser.

1 4. The electronic reading device of claim 1,
2 wherein the WAP message comprises a command for
3 controlling an electronic utility device.

1 5. The electronic reading device of claim 4,
2 wherein the WAP server is associated with the electronic
3 utility device.

1 6. The electronic reading device of claim 1,
2 wherein the transmitter transmits the WAP message via a
3 local wireless link.

1 7. The electronic reading device of claim 1,
2 wherein the transmitter sends the WAP message using one of
3 an infrared signal, inductive coupling, and a Bluetooth
4 radio interface.

1 8. The electronic reading device of claim 1,
2 wherein the transmitter sends the WAP message using a
3 cable.

1 9. The electronic reading device of claim 1,
2 wherein the WAP message comprises a uniform resource
3 locator (URL) and at least one common gateway interface
4 (CGI) call.

1 10. A system for controlling electronic utility
2 devices, comprising:

3 a formatted surface having an address pattern
4 such that a position relative to the address pattern can
5 be determined from a portion of the address pattern;

6 an electronic reading device having a sensor for
7 detecting positions of the electronic reading device
8 relative to the address pattern;

9 a client processor for generating a wireless
10 application protocol (WAP) message based on at least one
11 detected position;

12 an electronic utility device; and

13 a WAP server associated with the electronic
14 utility device for receiving the WAP message and for
15 controlling the electronic utility device in accordance
16 with the received WAP message.

1 11. The system of claim 10, wherein the electronic
2 reading device includes the client processor.

1 12. The system of claim 11, wherein the electronic
2 reading device further includes a radio transceiver for
3 transmitting the WAP message to the WAP server and for
4 receiving data relating to the address pattern from a
5 separate electronic device.

1 13. The system of claim 11, wherein the electronic
2 reading device transmits the WAP message to the WAP server
3 using one of an infrared signal, inductive coupling, and a
4 cable connection.

1 14. The system of claim 10, wherein the client
2 processor is located in a separate electronic device.

1 15. The system of claim 14, wherein the separate
2 electronic device comprises a mobile station.

1 16. The system of claim 14, wherein the separate
2 electronic device includes a display for displaying
3 information relating to the WAP message.

1 17. The system of claim 10, wherein the WAP message
2 comprises a common gateway interface (CGI) call.

1 18. The system of claim 17, wherein the client
2 processor further identifies a uniform resource locator
3 (URL) associated with the at least one detected position.

1 19. The system of claim 10, wherein the electronic
2 utility device is selected from the group consisting of an
3 appliance, an electronic audio device, and an electronic
4 video device.

1 20. A method for controlling an electronic utility
2 device, comprising the steps of:
3 detecting a portion of an address pattern with
4 an electronic reading device;
5 identifying at least one position of the
6 electronic reading device relative to the address pattern
7 using the detected portion of the address pattern;
8 translating the at least one position into a
9 control message for a particular electronic utility
10 device; and
11 controlling the particular electronic utility
12 device in accordance with the control message.

1 21. The method of claim 20, wherein the step of
2 identifying at least one position comprises identifying
3 handwritten information.

1 22. The method of claim 20, wherein the control
2 message comprises a wireless application protocol (WAP)
3 message.

1 23. The method of claim 20, further comprising the
2 steps of:

3 identifying a uniform resource locator (URL)
4 associated with the detected portion of the address
5 pattern; and

6 sending the control message to the identified
7 URL.

1 24. The method of claim 23, wherein the identified
2 URL is associated with the electronic utility device.

1 25. The method of claim 23, wherein the control
2 message is sent via a cable connection.

1 26. The method of claim 23, wherein the control
2 message is sent via one of an infrared interface, an
3 inductive coupling, and a Bluetooth radio interface.

1 27. The method of claim 20, further comprising the
2 step of sending the control message to a server associated
3 with the particular electronic utility device, wherein the
4 server performs the step of controlling.

1 28. The method of claim 20, wherein the control
2 message includes a common gateway interface (CGI) call.

1 29. The method of claim 20, further comprising the
2 step of retrieving data relating to the detected portion
3 of the address pattern, said data for use in the step of
4 translating.

ABSTRACT OF THE DISCLOSURE

A method and system for controlling an electronic utility device is implemented using an electronic reading device. A sensor in the electronic reading device detects portions of an address pattern on a surface that is formatted for use in controlling the electronic utility device. Based on the detected portions, a processor and/or wireless application protocol (WAP) browser, located in the electronic reading device or in a separate electronic device, can identify a position or positions of the electronic reading device relative to the address pattern and translate the identified position(s) into a control message. The control message is transmitted to a WAP server module associated with the electronic utility device, and the WAP server module accesses, controls, or operates the electronic utility device in accordance with the control message.

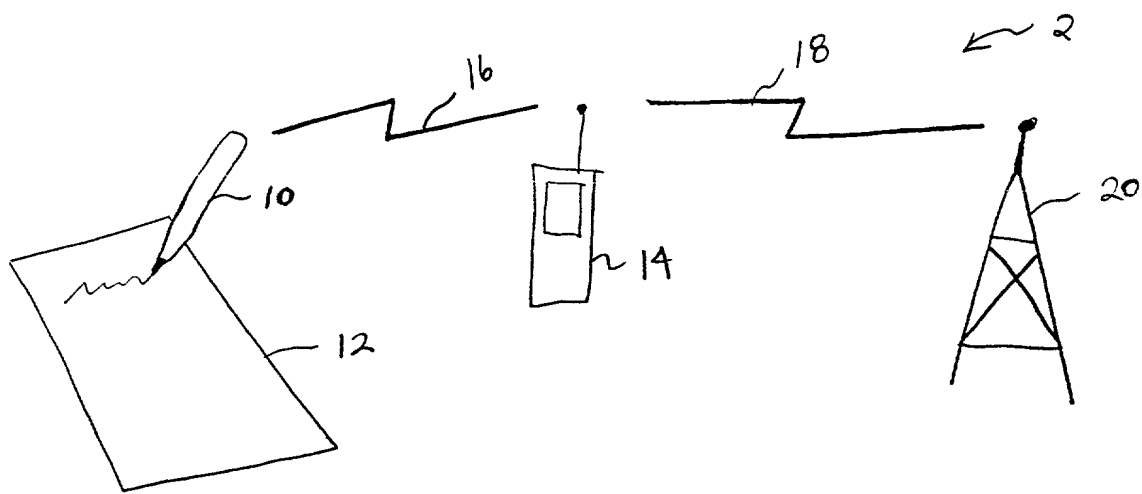


FIG. 1

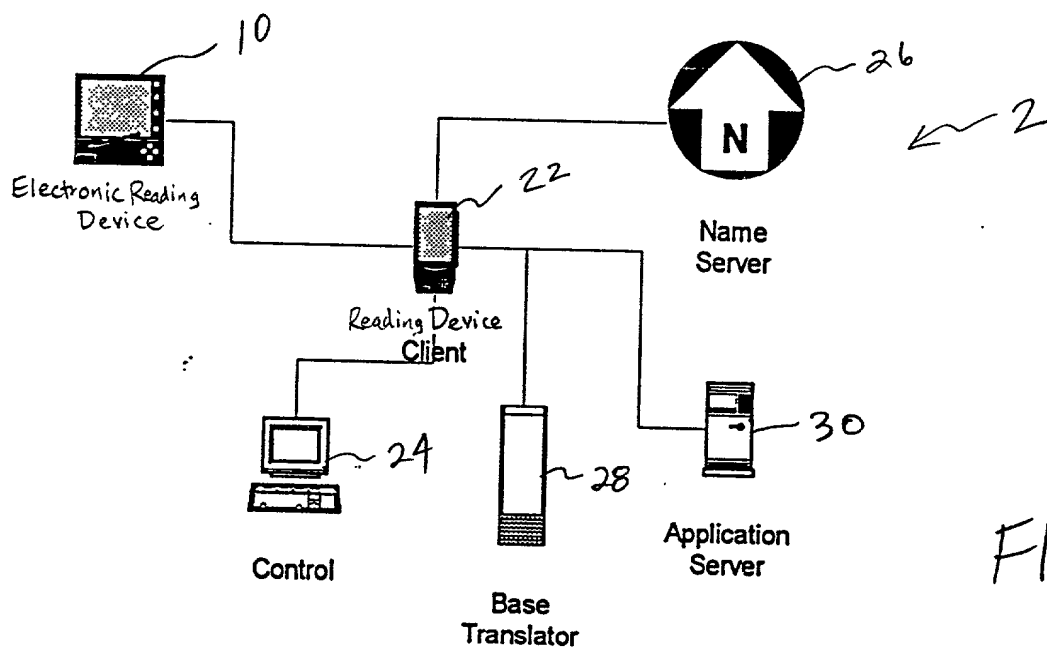


FIG. 2

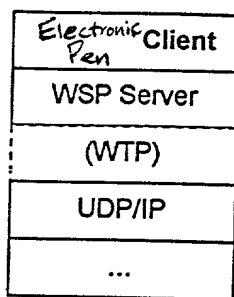
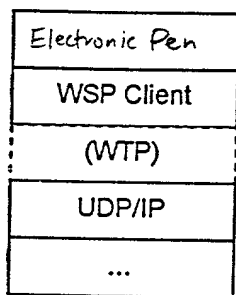


FIG. 3

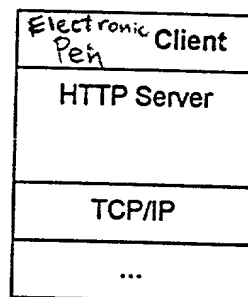
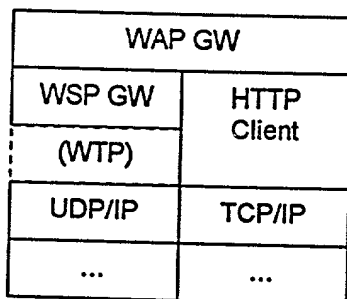
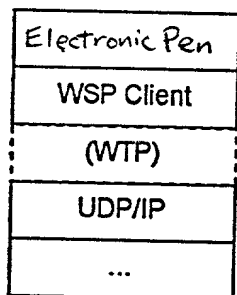


FIG. 4

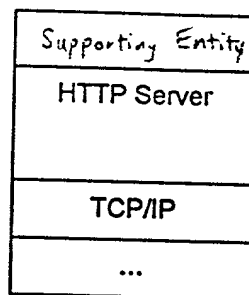
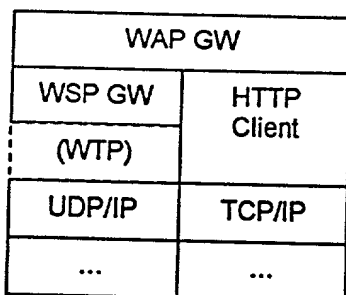
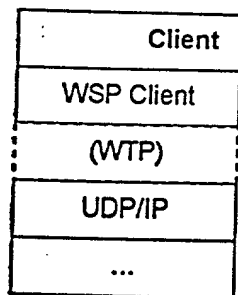


FIG. 5

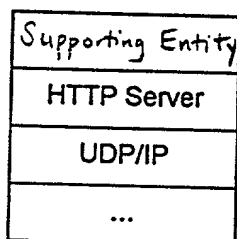
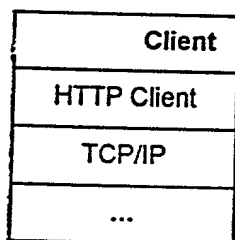


FIG. 6

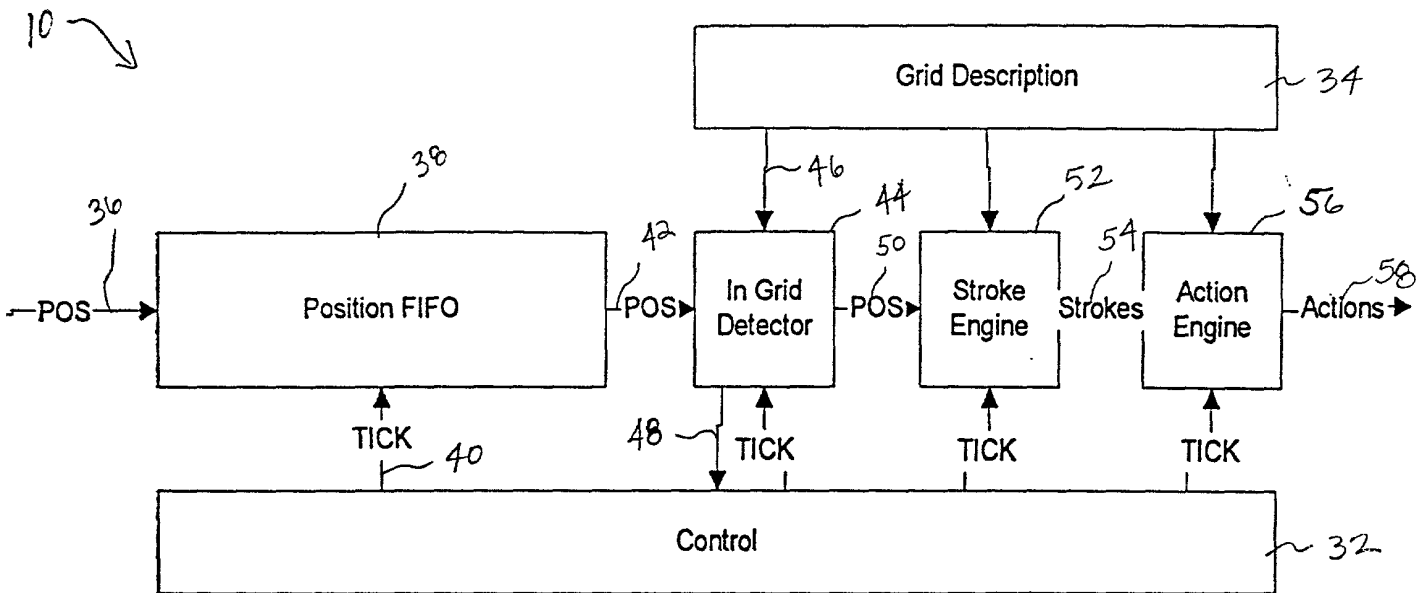


FIG. 7

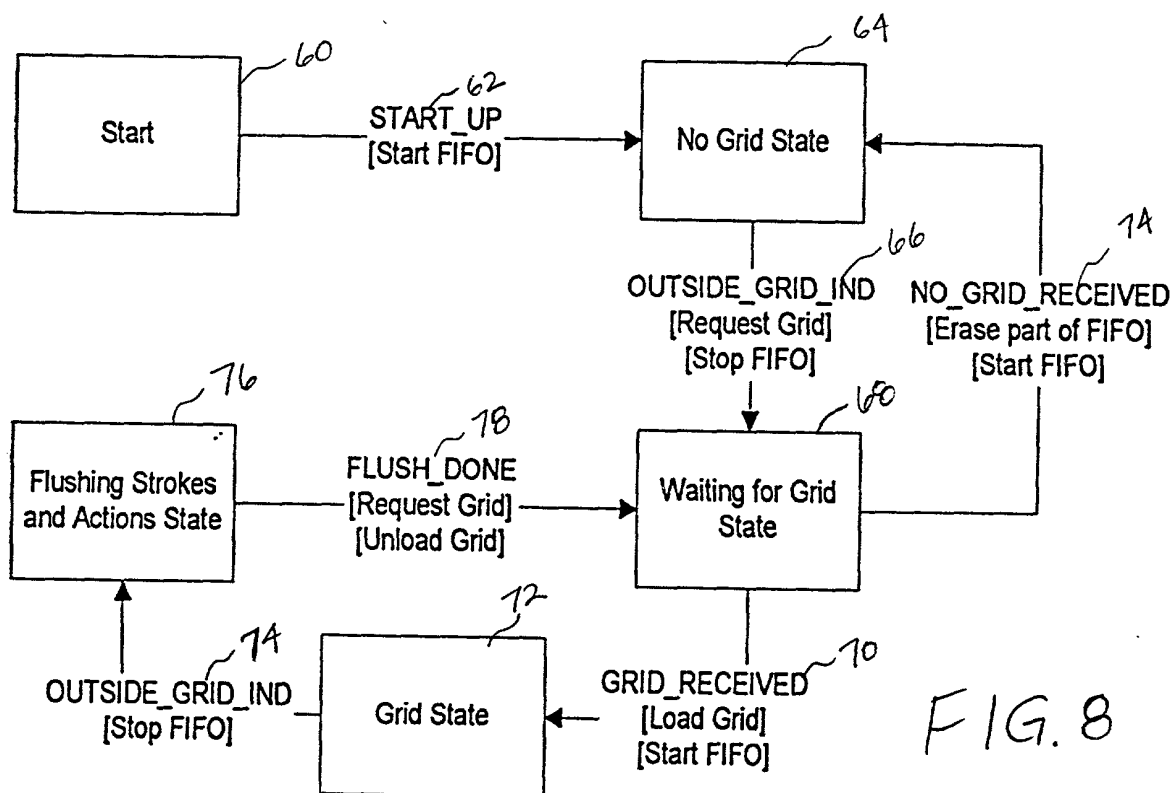
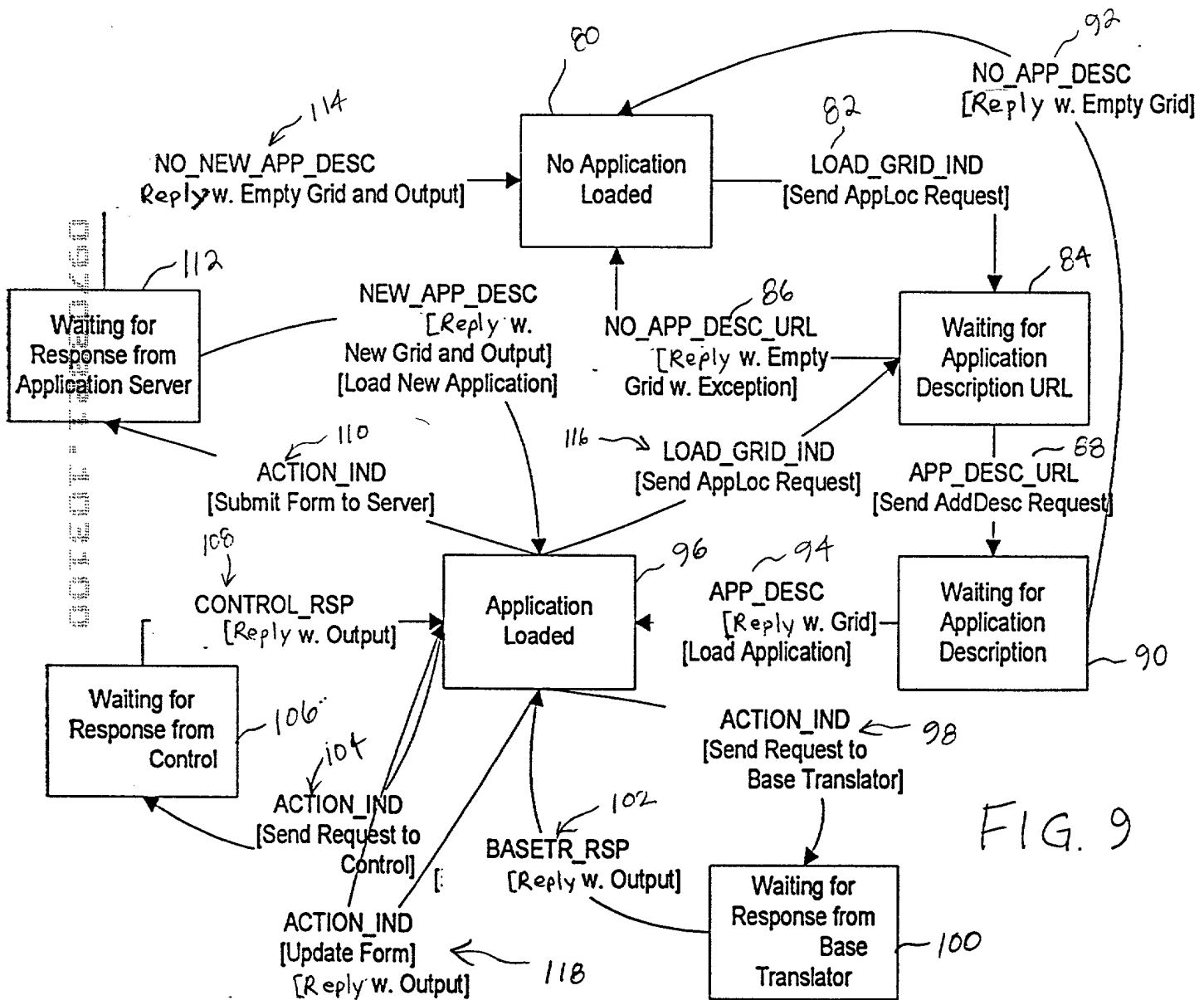


FIG. 8



The diagram illustrates the system architecture and the sequence of operations. The components involved are:

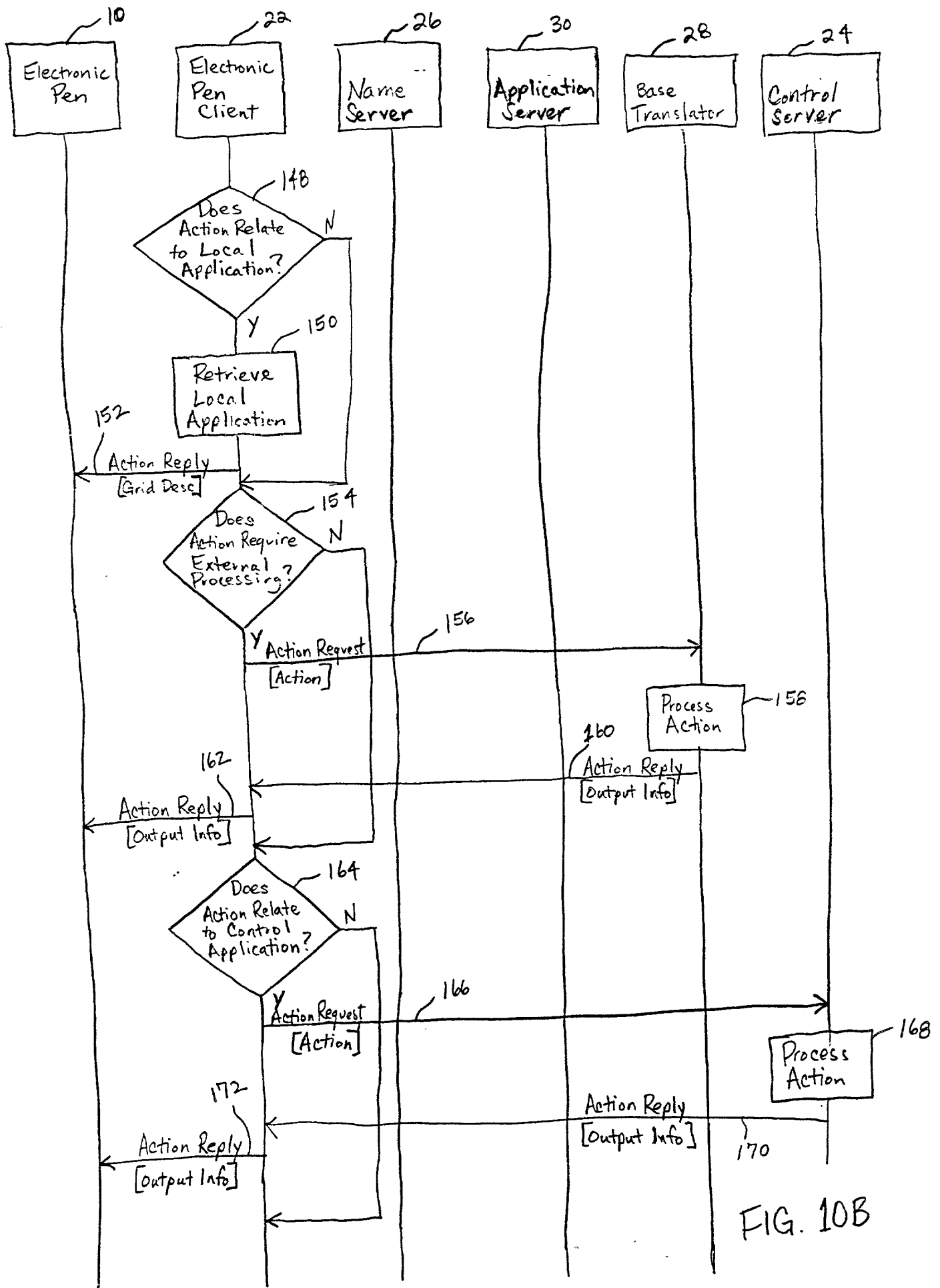
- Electronic Pen (10)
- Electronic Pen Client (22)
- Name Server (26)
- Application Server (30)
- Base Translator (28)
- Control Server (24)

The sequence of operations is as follows:

- The Electronic Pen (10) performs a "Detect Position on Address Pattern" (120).
- The Electronic Pen (10) sends a "New Grid Request [Pos]" (122) to the Electronic Pen Client (22).
- The Electronic Pen Client (22) sends an "App Loc Request [Pos]" (124) to the Name Server (26).
- The Name Server (26) performs "Translate Position Into URL" (126).
- The Name Server (26) sends an "App Loc Reply [URL]" (128) to the Electronic Pen Client (22).
- The Electronic Pen Client (22) sends an "App Desc Request [PenID]" (130) to the Application Server (30).
- The Application Server (30) performs "Retrieve Application Description" (132).
- The Application Server (30) sends an "App Desc Reply [App Desc]" (134) to the Electronic Pen Client (22).
- The Electronic Pen Client (22) performs "Parse and Store Application Description" (136).
- The Electronic Pen Client (22) sends a "New Grid Reply [Grid Desc]" (138) to the Electronic Pen (10).
- The Electronic Pen (10) performs "Store Grid Description" (140).
- The Electronic Pen (10) performs "Generate Strokes" (142).
- The Electronic Pen (10) performs "Generate Actions" (144).
- The Electronic Pen (10) sends an "Action Request [Action]" (146) to the Electronic Pen Client (22).

FIG. 10A

FIG. 10A



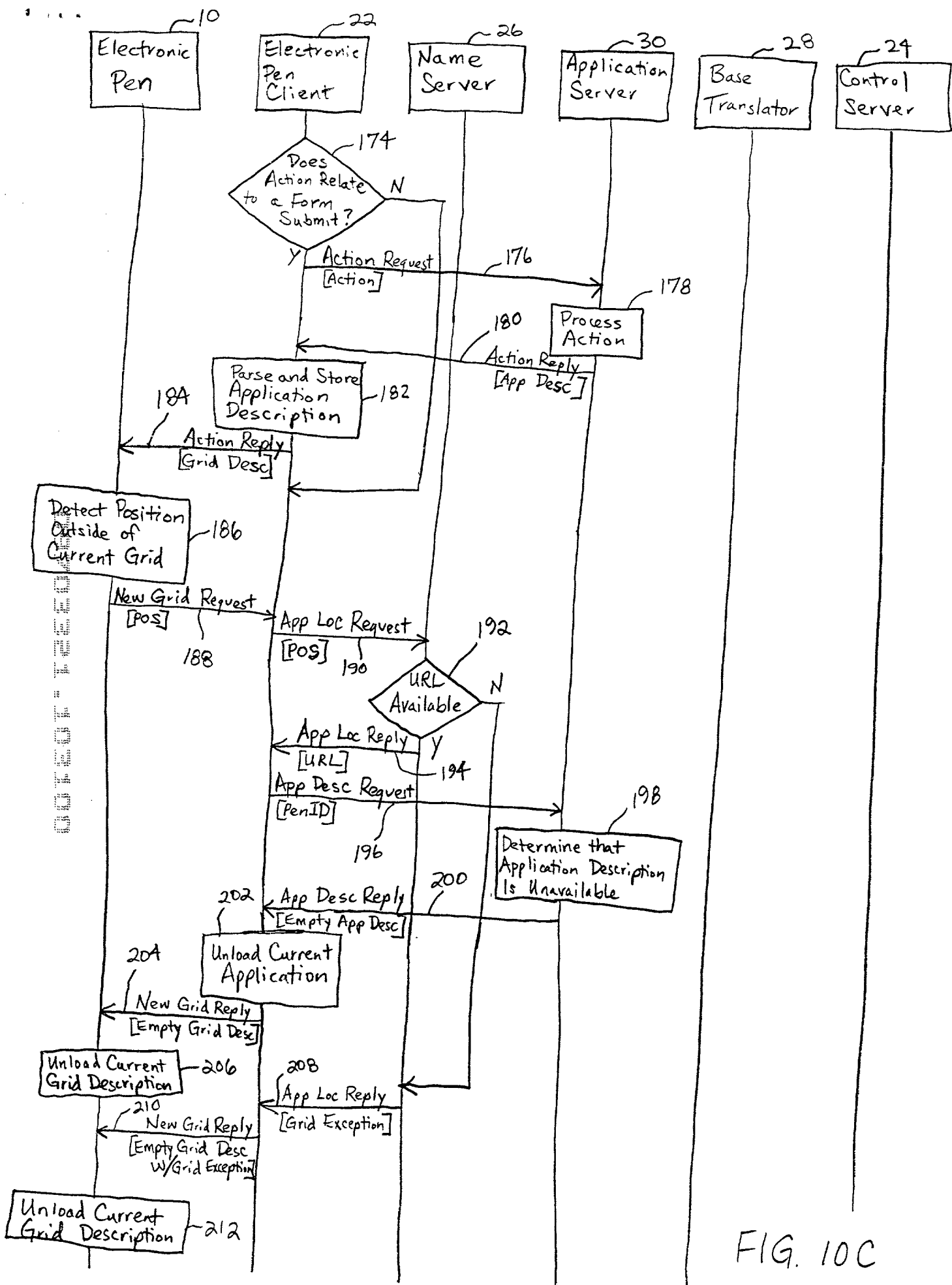


FIG. 10C

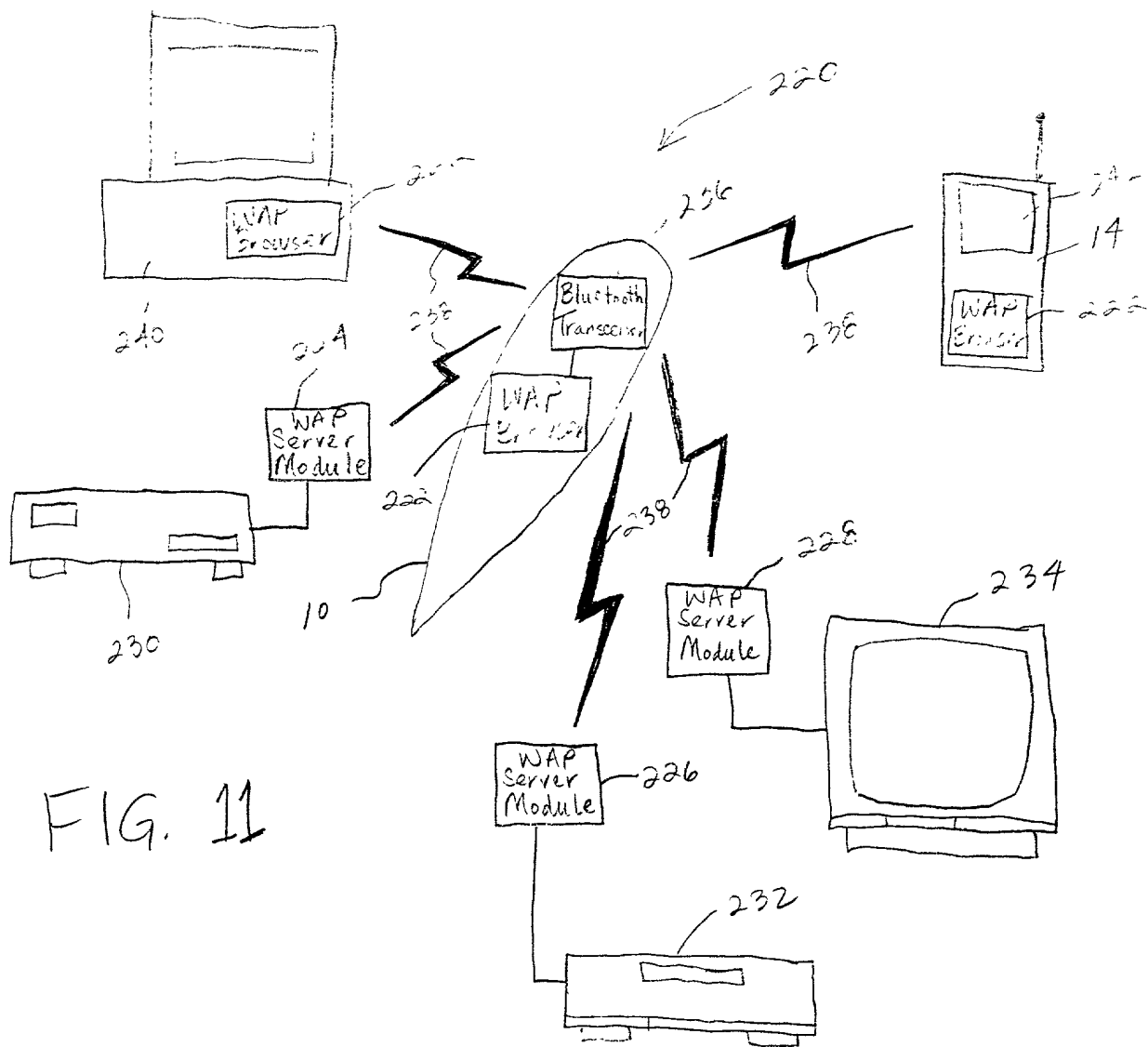


FIG. 11

FOR UTILITY/DESIGN/CIP/PCT NATIONAL APPLICATIONS

My residence, post office address and citizenship are as stated below next to my name; and

___ (a) is attached hereto.
 ___ (b) was filed on _ as Application Serial No. _ and was amended on ____ (if applicable)
 ___ (c) was filed as PCT International Application No. PCT/ ____ on ____ and was amended on ____ (if applicable).
 ___ (d) was filed on __ as Application Serial No. __ and was issued a Notice of Allowance on ____.
X (e) was filed on October 31, 2000 bearing attorney docket number 34650-657PT.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above or as allowed as indicated above.

I acknowledge the duty to disclose all information known to me to be material to the patentability of this application as defined in 37 CFR § 1.56. If this is a continuation-in-part (CIP) application, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose to the Office all information known to me to be material to patentability of the application as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

I hereby claim foreign priority benefits under 35 U.S.C. § 119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate filed by me or my assignee disclosing the subject matter claimed in this application and having a filing date (1) before that of the application

on which my priority is claimed or, (2) if no priority is claimed, before the filing date of this application:

PRIOR FOREIGN PATENTS

<u>Number</u>	<u>Country</u>	<u>Month/Day/Year</u> <u>Filed</u>	<u>Date first</u> <u>laid-open or</u> <u>Published</u>	<u>Date</u> <u>patented or</u> <u>Granted</u>	<u>Priority Claimed</u> <u>Yes</u> <u>No</u>
NONE					

I hereby claim the benefit under 35 U.S.C. § 120/365 of any United States application(s) listed below and PCT international applications listed above or below:

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below:

PROVISIONAL APPLICATIONS

<u>Application No. (series code/serial no.)</u>	<u>Month/Day/Year Filed</u>
60/182,742	February 16, 2000
60/190,343	March 16, 2000
60/192,662	March 28, 2000

PRIOR U.S. OR PCT APPLICATIONS

<u>Application No. (series code/serial no.)</u>	<u>Month/Day/Year Filed</u>	<u>Status(pending, abandoned, patented)</u>
NONE		

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